POLOS Series
single wafer spin processor

POLOS™

www.spincoating.com

2015/09

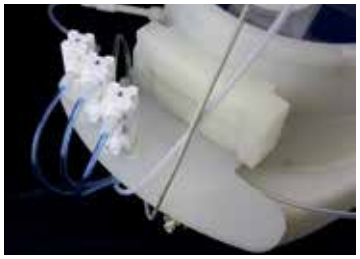
Are you ready for the future?

When it comes to spin process applications, the possibilities are endless. Where today's requirement stopped at a simple clean rinse program on a 4" substrate, tomorrow's process may require mask cleaning, or a coating step for fragments. The POLOS Single wafer processor offer a solution to most applications.

Each Fab, each R&D or even each student in university employs different processes. Therefore we offer **unlimited processes**: intuitive programing on the touchscreen controller, even USB up - or download from your own pc, if so preferred, with unlimited programs /steps and graphical representation.

The digital motor speed controller enables accurate acceleration and stable rotations: critical factors for **coating uniformity.**

The versatile, high - quality, all plastic POLOS single substrate spin processors are specifically designed for R&D and low volume production in the MEMS, Semiconductor, PV, Microfluidics field, etc. Suitable for all typical spin processes: **cleaning, rinse/dry, coating, developing** and **etching**. Various models have proven themselves over the years for processing a wide range of substrates from small fragments up to Ø300mm substrates. We offer even units for flat panels up to 1000mm square.



For our spin processors and chucks we use **NPP**- H with α-crystalline properties. This NPP offers users considerably improved rigidity, in addition to increased toughness. In fact, the level of rigidity measured at 100°C is twice as high as that of β-nucleated PP. At low temperatures, in particular, it displays higher impact resistance than standard NPP-H, thus combining greater functionality with improved safety:

Benefits

- Finer and more stable alpha crystalline structure
- Superior notched impact strength and enhanced rigidity
- Longer service life
- Improved chemical resistance and superior stress crack resistance

Where the application requires **PTFE**, we use TFM1600 material, superior for use with chemicals above standard PTFE, with a much higher material surface density than standard PTFE, thus significantly lower "Memory Capability" for absorbing contamination from Chemicals.

Liners are available in **PET** (Polyethylenterephthalat), 0.5mm thick, transparent, antistatic (10^8 - 10^{10} Ω) to prevent possible build-up of static charge in the chamber.

Clear view of your process

Tempered Glass lid does not haze or scratch, remaining Clear and easy to see your process.

Labyrinth Seal protects the motor and control electronics from chemical contamination.

CE Certified
designed for
Your Safety

***depending on substrate size and chuck type**

System Benefits:

- High speed acceleration up to 0 - 12,000rpm in 0.3 sec.* between speed and acceleration
- Without line break
- Max acceleration 30,000rpm/sec
- A detachable touch screen control panel for use outside a glove box.
- Programmable CW & CCW rotation enables specialist processes such as “puddle” develop and/or etch.
- Full-Engineering Plastics only, high quality seamless fabrication.

Rugged, lid hinge holds at **Optimum** angle for **Easy Access**, and for your safety locks electromagnetically until the end of process until fully reached 0 rpm or in case of power failure.

Vee-Lid ensures residual chemicals on the lid run Safely to system drain.

Syringe Holder & Diffuser for **N_2 purge** enables uniform purge with reduced air turbulence in the chamber.

SPIN150i - SPIN200i

The SPIN150i & SPIN200i spin processors are advanced systems offering precise, repeatable process control. An aerodynamically efficient chamber enhances uniformity, while natural polypropylene or PTFE construction ensures a no-metals, contamination-free process area, easy to clean.

SPIN150i

- Programmable CW & CCW Rotation
- Uniformly Accurate
- 0 rpm-12,000 rpm, accuracy +/-0.1 rpm
- Acceleration 0-30,000 rpm/sec, accuracy +/- 0.1 wrpm

SPIN200i

The SPIN150i/200i are very small footprint systems with capacity for up to 6"Ø wafers (SPIN150i), or up to 8"Ø wafers (SPIN200i), and pre-configured with a nitrogen purge nozzle/syringe holder. The SPIN150i comes with a chuck and fragment adapter, which will hold a wide range of substrates from small pieces (minimum 10mmØ area) up to 6"Ø. The SPIN200i comes with a chuck that will hold from 4"Ø to 8"Ø wafers - or can alternatively be specified with the same chuck and adapter as the SPIN150i model. (Chucks for 6"Ø wafers and below can be used on either model.)

The SPIN150i/200i offer exceptional value and capability - precise speed range of 0-12,000rpm +/-0.1rpm accuracy, +/-1rpm resolution with fully programmable CW & CCW rotation (ideal for "puddle" develop), and per-step acceleration to cover any process requirement. Easy-entry colour touchscreen, self-explanatory icons for ease of operation for new users.

A quality choice for the long-term, the SPIN150i & SPIN200i are designed and manufactured in Germany.

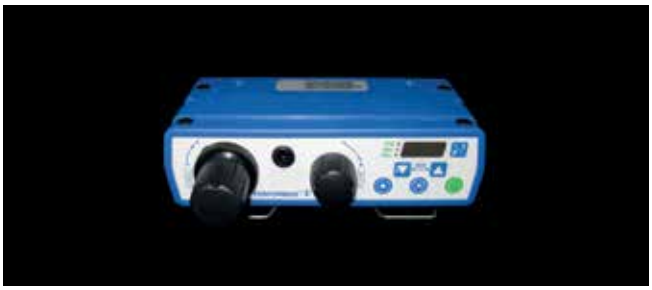
Specifications SPIN150i - SPIN200i

Specifications	SPIN150i	SPIN200i
Available number of programs:	Unlimited*	Unlimited*
Steps per program:	Unlimited*	Unlimited*
Spin speed:*	0-12,000 rpm** +/-1rpm steps	0-12,000 rpm** +/-1rpm steps
Spin speed accuracy:	± 0.1 rpm **	± 0.1 rpm **
Spin rotational direction:	Clockwise, Counter clockwise, Puddle	Clockwise, Counter clockwise, Puddle
	30,000 rpm/sec**	30,000 rpm/sec**
Max. acceleration:	Unlimited*, ± 0.1 seconds steps	Unlimited*, ± 0.1 seconds steps
Spin time	3 pcs, relays, nominal switching	3 pcs, relays, nominal switching
Free programmable outputs:	capacity 0.5A/125 VAC - 0.3A/ 60DC	capacity 0,5 A/125 VAC - 0.3A/ 60VDC
System data		
Housing material:	Natural Polypropylene (NPP)***	Natural Polypropylene (NPP)***
Process chamber material:	Natural Polypropylene (NPP) or High	Natural Polypropylene (NPP) or High Chem-
	Chemical Resistant PTFE (TFM)	ical Resistant PTFE (TFM)
Interface:	Detachable, full-size touchscreen,	Detachable, full-size touchscreen,
	glove-friendly, IP52, chemical	glove-friendly, IP52, chemical
	resistant	resistant
External connection:	1 USB Port in the controller	1 USB Port in the controller
Max. substrate diameter:	160mm round or 4" x 4" square	260 mm round or 6" x 6" square
Max. process chamber diameter:	202 mm	302 mm
Dimension (desktop version):	274 (w) x 250 (h) x 451 (d) mm	380 (w) x 307 (h) x 559 (d) mm
Shipping weight:	14 kgs	20 kgs
Shipping dimension:	600 x 380 x 360 mm	680 x 580 x 480 mm
Requirements		
Voltage:	100 - 120 VAC / 200 - 240 VAC	100 - 120 VAC / 200 - 240 VAC
	50/60 Hz (auto select)	50/60 Hz (auto select)
Power consumption:	Max. 500 W	Max. 500 W
Max. current:	5A / 2,5A	5A / 2,5A
Vacuum:	- 65 kPa (-19 inchHg), ≥ 80 lpm	- 65 kPa (-19 inchHg), ≥ 80 lpm
	Tube OD Ø8mm	Tube OD Ø8mm
Motor purge gas:	20 - 50 kPa, 2-5 l/min, Tube OD Ø 6mm	20 - 50 kPa, 2-5 l/min, Tube OD Ø 6mm
Drain connection:	1" M-NPT	1" M-NPT

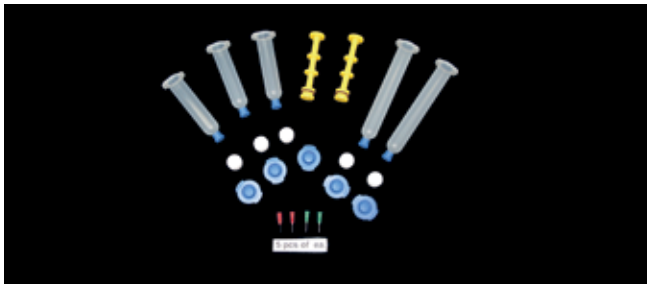
* Considering additional capability of standard unit such as USB backup, recipe cycling, PC software etc.
** Measured without substrate, limitations may apply depending on chuck used and substrate specification.
*** For our spin processors and chucks we use NPP-H with α-crystalline properties.

Options SPIN150i/SPIN200i

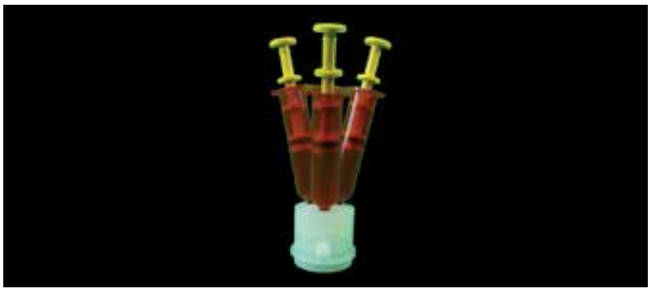
Liner Set
Liners are available in PET (Polyethylentere-phthalat). 0.5mm thick, transparent, antistatic (10^8 - 10^{10} Ω) to prevent possible build-up of static charge in the chamber.



Dispense Unit
Can be mounted in syringe holder and be connected to one of the 3 programmable dry contacts.



Syringe Holder Starter Kit
Consisting of several 30cc dispense barrels, nee-dles and plungers.

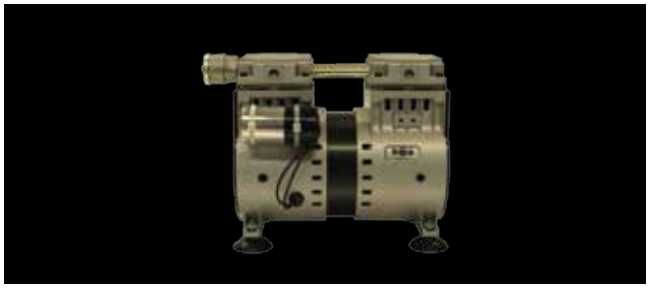


Central Dispensing Syringe Holder
For single or triple syringes, with integrated N_2 diffuser.

Foot Switch
For hand free usage; controlling start/stop function and vacuum.

Centering Tool
Easy to use centering tool readjustable for different sizes.

Corrugated Drainhose and connector
In NPP, including connection to connect to the drainport.



Vacuum Pump
The vacuum pump is very quite and reliable.

POLOS Advanced 200 - 300 - 450

The Polos Advanced series allow the user to either dispense manually through the syringe or by using the optional manifold, with selectable valve for dispensing one (1) chemical from the Dispense Vessel (DV), DI Water or N_2

- Automatic Sequential or Parallel Chemical Dispense
- Up to 6 spray nozzles
- Each programmable independently

450mm

200mm

300mm

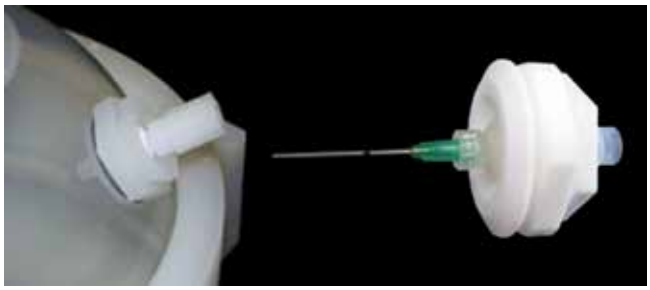
Specifications POLOS Advanced

Specifications	POLOS 200 Advanced	POLOS 300 Advanced
Available number of programs:	Unlimited*	Unlimited*
Steps per program:	Unlimited*	Unlimited*
Spin speed:*	1 - 12,000 rpm** ± 1rpm steps	1 - 12,000 rpm** ± 1rpm steps
Spin speed accuracy:	± 0.1 rpm **	± 0.1 rpm **
Spin rotational direction:	Clockwise, Counter clockwise and Puddle	Clockwise, Counter clockwise and Puddle
Max. acceleration:	30,000 rpm/sec**	30,000 rpm/sec**
Free programmable outputs:	3 dry relays as standard	3 dry relays as standard
	Up to 16 digital input, 16 digital output, 4 analog input, 4 analog output (with optional IO modules)	Up to 16 digital input, 16 digital output, 4 analog input, 4 analog output (with optional IO modules)
System data		
Housing material:	Natural Polypropylene (NPP)	Natural Polypropylene (NPP)
Process chamber material:	Natural Polypropylene (NPP) or High Chemical Resistant PTFE (TFM)	Natural Polypropylene (NPP) or High Chemical Resistant PTFE (TFM)
Interface:	Detachable, full-size touchscreen, glove-friendly, IP52, chemical resistant	Detachable, full-size touchscreen, glove-friendly, IP52, chemical resistant
External connection:	1 USB Port in the controller	1 USB Port in the controller
Max. substrate diameter:	260mm round or 6" x 6" square	360mm round or 8" x 8" square
Max. process chamber diameter:	302 mm	402 mm
Dimension (desktop version):	380 (w) x 307 (h) x 599 (d) mm	430 (w) x 310 (h) x 650 (d) mm
Shipping weight:	20 kgs	32 kgs
Shipping dimension:	680 x 580 x 480 mm	780 (w) x 620 (h) x 580 (d) mm
Requirements		
Voltage:	100 - 120 VAC / 200 - 240 VAC 50/60 Hz (auto select)	100 - 120 VAC / 200 - 240 VAC 50/60 Hz (auto select)
Power consumption:	Peak 1800 W	Peak 1800 W
Max. current:	10A / 8A	10A / 8A
Vacuum:	- 80 kPa (-24 inchHg), ≥ 80 lpm Tube OD Ø8mm	- 80 kPa (-24 inchHg), ≥ 80 lpm Tube OD Ø8mm
Motor purge gas:	20 - 50 kPa, 2-5 l/min, Tube OD Ø 6mm	20 - 50 kPa, 2-5 l/min, Tube OD Ø 6mm
Drain connection:	1” M-NPT	1” M-NPT

Specifications	POLOS 450 Advanced
Available number of programs:	Unlimited*
Steps per program:	Unlimited*
Spin speed RPM:	0-1,500 rpm** ± 1rpm steps
Spin speed accuracy:	± 0.1 rpm **
Spin rotational direction:	Clockwise, Counter clockwise
	and Puddle
Max. acceleration:	≤1500 rpm/s depends on the load**
Free programmable outputs:	3 dry relays, nominal switching capacity
	0.5A /125 VAC - 0.3A / 60DC
System data	
Housing material:	Natural Polypropylene (NPP)
Process chamber material:	Natural Polypropylene (NPP) or
	High Chemical Resistant PTFE (TFM)
Interface:	Detachable, full-size touchscreen,
	glove-friendly, IP52, chemical resistant
External connection:	1 USB Port in the controller
Max. substrate diameter:	460 round and 350x350mm square substrates
Max. process chamber diameter:	502 mm
Dimension (desktop version):	795 (w) x 638 (h) x 922 (d) mm
Shipping weight:	75 kgs
Shipping dimension:	800 x 790 x 1180 mm
Requirements	
Voltage:	200 - 240 VAC
	50/60 Hz
Power consumption:	Peak 1000W
Max. current:	10A
Vacuum:	-80 kPa (-24 inchHg), ≥ 80 lpm.
	Tube OD Ø 8mm
Motor purge gas:	20 - 50 kPa.
	Tube OD Ø 6mm 500lph
Drain connection:	1,5” M-NPT

* Considering additional capability of standard unit such as USB backup, recipe cycling, PC software etc.
** Measured without substrate, limitations may apply depending on chuck used and substrate specification.

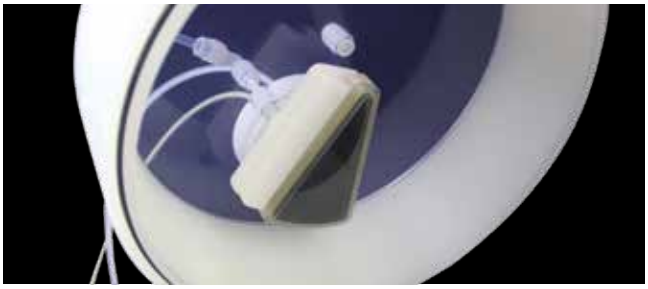
Options POLOS 200/300/450 Advanced



EBR (Edge Bead Removal)

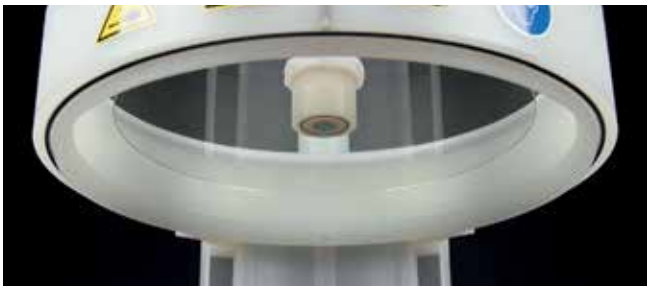
Auto Dispense Lines

Full PTFE Dispense Vessel Automated injector line

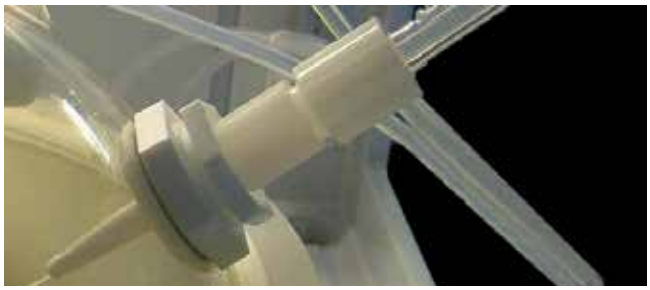


MegPie
The Sapphire MegPie is a single-wafer Megasonic transducer for cleaning and sonochemical processing.

BSR (Back Side Rinse)

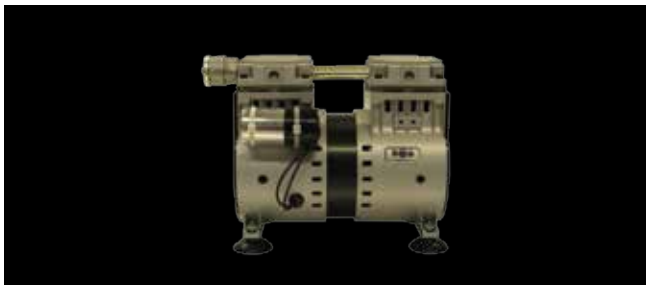


Static Barrier Plate



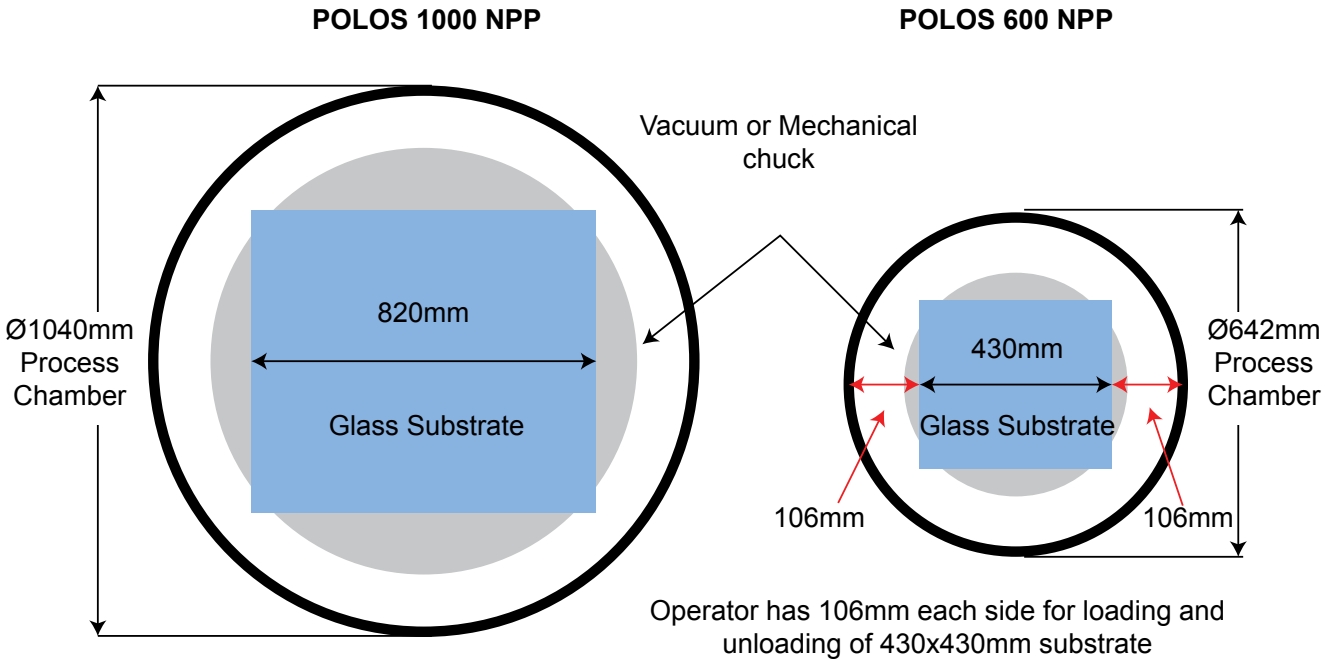
High Pressure Jet

Corrugated Drainhose, Drain tank and connector In NPP, including connection to connect to the drainport.



Vacuum Pump
The vacuum pump is very quite and reliable.

POLOS 600 - 1000



Vacuum or Mechanical Chucks

We offer several chucks for use in our Spin Coaters. One vacuum chuck is always included standard with the system. We stock a range of precision machined polypropylene or PTFE (solvent safe) chucks compatible with our Spin Coaters up to 300mm. Our chucks are machined to close tolerances and provide an exceptionally flat, rigid surface for mounting substrates of different sizes, weights, and shapes.

All units come standard including vacuum chuck. Smaller sizes include an interchangeable small fragment adapter with push fit base that fits firmly onto the standard included chuck for ease of use. SPS-Europe can also provide custom chucks depending on your application, including porous PTFE for thin substrates. For square and rectangular substrates we offer a recessed design which holds the substrate securely in place both with or without vacuum, reducing substrate warpage for better film uniformity during coating.

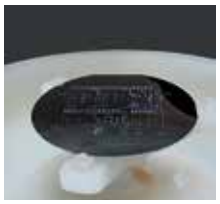
Chucks are available in following materials*:
PP: NPP with EPDM o-ring, FP: PTFE (TFM1600® with FKM o-ring), SS: Stainless Steel, AL: Aluminium

Fragments

Dies, Wafer, Fragments, etc.

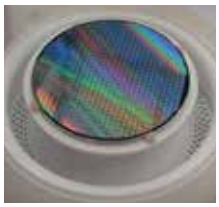
Round Substrates

Vacuum for 2” up to 300mm Wafer



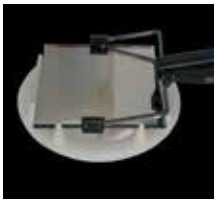
Low Contact

MEMS



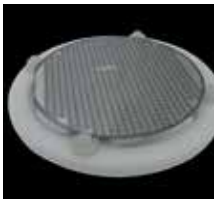
Round Substrates

Vacuum and Centering pins



Glass Substrates

Mask, Solar, Cells, etc.



Round Substrates

Mechanical and Centering pins

Other Substrates

Labatory Glass, etc.

Thin, Fragile Substrates

Foils, etc.

***Note: Other materials available on request, please contact us for details.**

Typical Applications

Our full range spin processors cover a wide range of proces applications. In combination with our megasonic MegPie and special Lift-Off Fluid can be used for photoresist strip or even metal lift-off. Our POLOS Advanced series can be used with ozone in DIW (DiO_3) providing an effective replacement for Piranha (H_2SO_4, H_2O_2) cleans.

Suitable for all typical spin processes. Systems are available in all PTFE constructions for special applications.

Cleaning

Etching

Coating

Developing

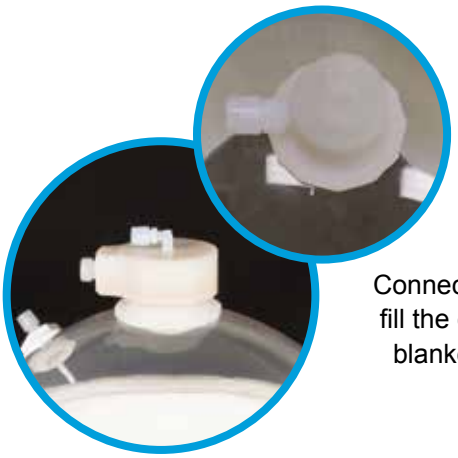
The next pages will provide you with some typical applications that emphasize the wide range of process capabilities.

Coating

Spincoating is one of the most common techniques that is used for the fabrication of (nanometric) polymer thin films (PDMS, blockcopolymers, etc.) The acceleration within the programmable spin speed is important as it defines the range of thicknesses that can be achieved from a given solution. In general, spin coating can produce uniform films relatively easily from about 1,000 rpm upwards

The advantages of the Polos range spin coaters with high speed up to 12,000rpm and in ramp-up of 0.3 sec* are its ability to quickly and easily produce very uniform films from a few nanometres to a few microns in thickness.

The control of the motor mode rotation (clockwise/counterclockwise), in combination with the up to 6 automatic dispensers, allows to obtain an uniform deposition of multilayer thin films and to perform photoresist development. These features enable a quick work optimization with fully automatic processes and high reproducibility.

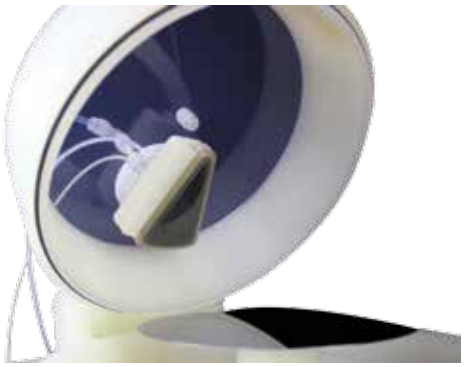


Connect N_2 top purge to fill the chamber with N_2 blanket met close up

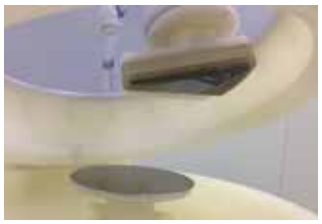
The physical and chemical cleanliness of a substrate is critical for high quality films regardless of the application method. Our units can be incorporated with Megasonic allowing one system for a wide range of processes.

*depending on substrate size and chuck type

Example: Post-CMP Cleaning

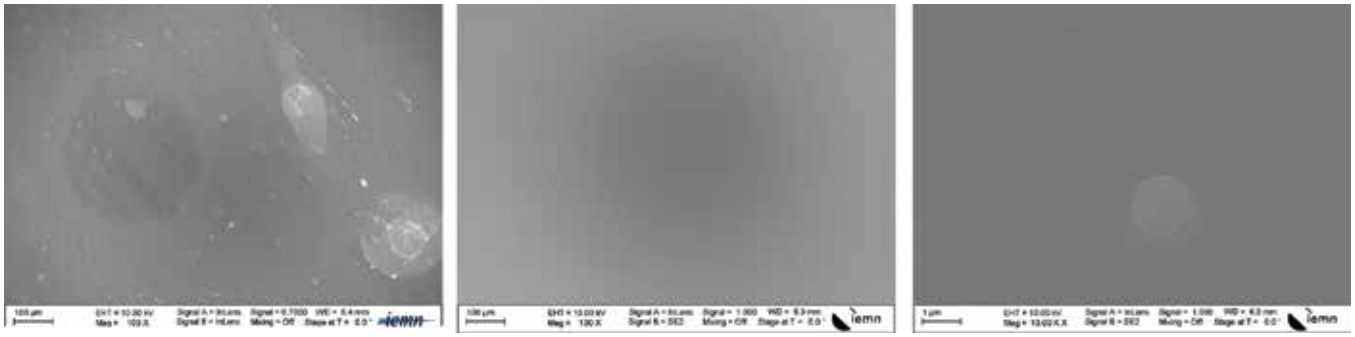


After CMP often the surface is highly contaminated by slurry residues. Tests* on 3” polished silicon wafer pressure a slurry containing 50nm colloidal silica particules showed that by using the POLOS Advanced with ZTop MegPie Megasonic Transducer, operating around 1MHz and using diluted NH_4OH, excellent results were obtained.



Highly diluted (2%) NH_4OH is used to enhance electrostatic repulsion between particules and surface (control of Zeta potential) to avoid re-deposition and re-attachment.

After CMP **After megasonic cleaning**



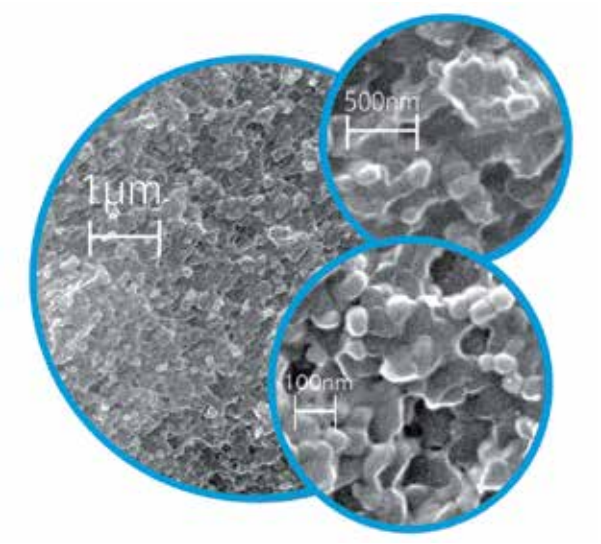
In our test case the Polos ZTop MegPie integration kit for Polos Advanced 200mm was implemented. This MegPie kit allows you to choose between 150 and 200mm active area, and is available in a Sapphire or Stainless Steel ZTop MegPie.

The Polos ZTop MegPie control is integrated into the software of the Polos Advanced, allowing servocontrolled positioning of the MegPie, forward power, as well as monitor the reflected power and control the temperature alarms. The distance to the substrate is monitored with an ultrasonic sensor.

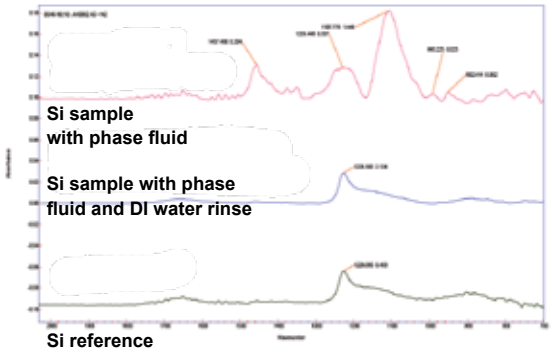
Upon Megasonic cleaning using diluted NH_4OH, excellent results are obtained.

* Test report available at request.

Example: Non-Hazardous Cleaning, Photoresist Stripping and Metall Lift-Off



Residue Free Removal



FTIR characterisation of Si reference and sample after fluid and water rinse off shows total surface recovery and absence of any residues.

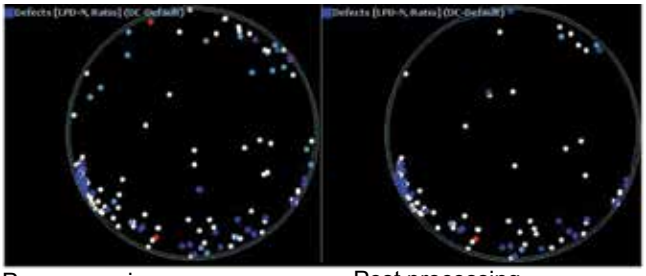
Physical Data Overview

Parameter	IisoPUR® fluid
pH	5-7 (undiluted)
Flash point (DIN EN 22719)	>60°C n. definable
Flow time (DIN 53211)	~ 54 sec. (22°C)
Boiling point	90-98°C
Freezing point	-5-4°C
Gravitiy (22°C)	0,996 g/cm3
Viscosity (20°C)	t.b.d.

The fluids are compatible with all silicon, silicon dioxide, silicon nitride, titanium, metals and metal oxides and many other substrates. The working principle of the fluids is a pure physical lifting off instead of a chemical dissolving.

SPS-Europe offer water based intelligent fluids® that use a non-disruptive, unique technology based on smart, gentle ingredients to enable new possibilities for innovative stripping and lift-off applications in microelectronics.The IisoPUR® product family are liquid-liquid based fluids which form dynamic inner structures. The fluids are built up from dynamic and flexible plasmicells. The globular shapes of the fluid interact with each other and tend to change their forms within milliseconds (1,000 to 8,000 times per second).

Particle Free Application



Pre processing	Post processing
74 defects	112 defects (38 adder)
0.12-1.00µm	0.12-1.00µm

Particle measurement (KLA Tencor SP2) indicates almost neutral particle behaviour after cleaning with phase fluid and diluted SC1 short rinse. Use of the MegPie can reduce the process time or support the performance. Due to the pH neutral fluid and the new working principle the surface properties of the substrates stays uneffected. Final rinse leaves wafer surface uneffected and free from residues.

Intelligent fluids® are Enabler for

Technology Advantages on Substrates

The character of the fluids reduces critical impacts of the stripping process, such as surface roughness, pattern collapse, insufficient wetability and reduces process complexity.

TCO & Performance Advantages

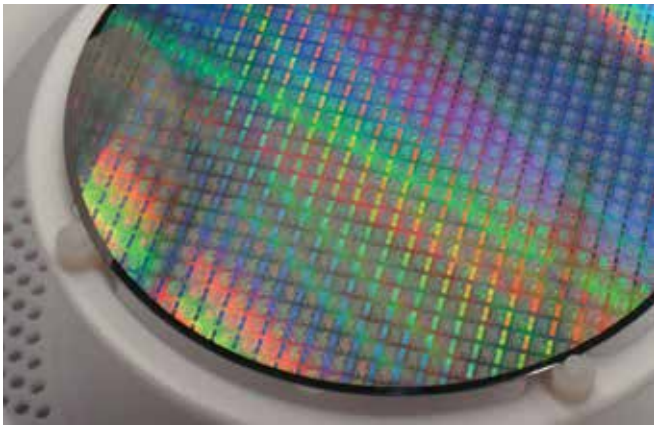
The smart mode of action optimises process parameters like time, temperature, energy, consumption and/or bath life.

Ecological Advantages for Safe Use

Intelligent fluids® consist only of gentle ingredients without hazardous potential. The waterbased formulations are non flammable, pH neutral, biodegradable, and can easily deactivated by adding water.

Advantages of IisoPUR®

- Enables future semiconductor technology trends
- Reduced total costs of ownership
- Reduction of process steps er time
- Extraordinary stripping performance
- Sustainable process fluids (incl. recycling)
- Dermatologically tested (very good)
- Neutral pH range, non corrisive, non etching
- No substrate stress, corrosion or oxidation
- Smart but powerful formulations

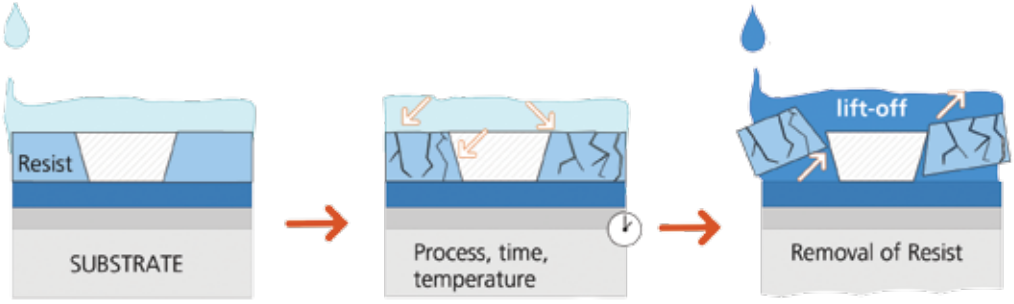


Process Data for IisoPUR® waterbased Photoresist Stripper

Batch Bath Process (example)	Single Wafer Process (example)
Adjust required bath temperature (20 to 50°C)	(pre treatment in soak bath if requested)
Immerse wafer lot into bath	Wet transfer on single wafer chuck
Leave wafers in bath for requested time	Spray IisoPUR®: 90psi, 250rpm, 50°C, 60sec.
Use ultrasonic/agitation for faster process	DI water spray: 90psi, 250rpm, 50°C, 30sec.
Bring wafers into rinse cascade	IPA rinse: no pressure, 250rpm, RTemp., 30sec.
Rinse with DI water, IPA or intelligent rinse®	Dry spin: no pressure, 2000rpm, RTemp., 60sec.
Dry wafers with nitrogen or compressed flow	All steps under nitrogen atmosphere (optional)

Stripping times vary from few seconds to few minutes, depending on resits thickness and crosslinking. Agitation or ultrasonic can reduce the process time or support the performance. Due to the pH neutral fluid and the new working principle the surface properties of the substrates stays uneffected. Final rinse leaves wafer surface uneffected and free from residues.

STEP 1	STEP 2	STEP 3	STEP 4
IisoPUR® stripper starts to penetrate and diffuse the photoresist layer.	Creeping/fragmenting reduces adhesion forces of layer and substrate.	Rinse-off (DI water, IPA, etc.) removes fragmented resist from wafer.	Wafer drying at high velocity spinning



Example: Megasonic Enhanced Photoresist Strip with DiO_3

Dissolved ozone in DIW (DiO_3) provides an effective replacement for Piranha (H_2SO_4, H_2O_2) cleans. The fundamental chemistry of ozone based cleaning is due to direct and indirect reactions of ozone and oxygen radicals (the so-called radical pathway). Due to its high oxidation rate the radical pathway can accelerate the reaction. Megasonic energy can act as an initiator for the radical pathway. At the same time, due to the creation of turbulence inside the boundary layer, the available ozone close to the surface is increased.

In a study by D. Dussault of ProSys and Jens Fittkau and Christiane Gottschalk of ASTeX GmbH, the authors show, that the combination of DiO_3 and a uniform Megasonic energy field in a conventional single wafer spinner significantly increases the strip rate of various positive PR coatings compared with DiO_3 alone. They measure improvements in strip rate of over 65% (figure 5) Variations in spin speed (rpm), flow rate (lpm), and megasonic dosage (W/cm2) resulted in large effects on the measured strip rate.

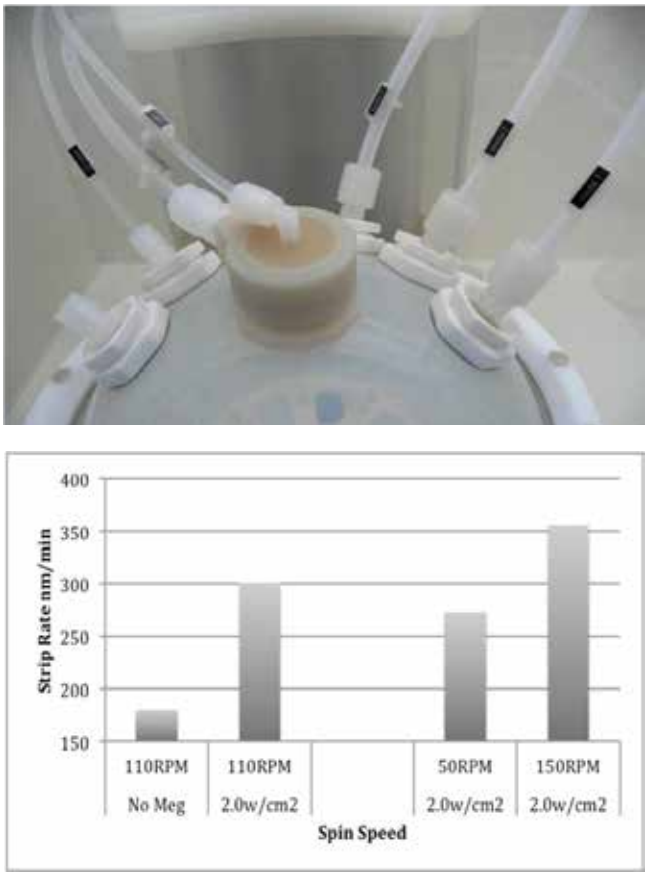


Figure 5. Comparison of spin speeds, AZMIR701 PR, 80ppm, 20c, 1.4lpm.

The POLOS Advanced 200 series allow for ±0,1rpm** spin speed accuracy, and the user can easily program speed up to 12,000 rpm in 1 rpm steps. Up to 6 dispense lines can be automatically controlled.

** Measured without substrate, limitations may apply depending on chuck used and substrate specification

Source: References [1] US Patent 6,791,242 (2004)

Don Dussault , ProSys Inc, Jens Fittkau2 and Christiane Gottschalk, ASTeX GmbH

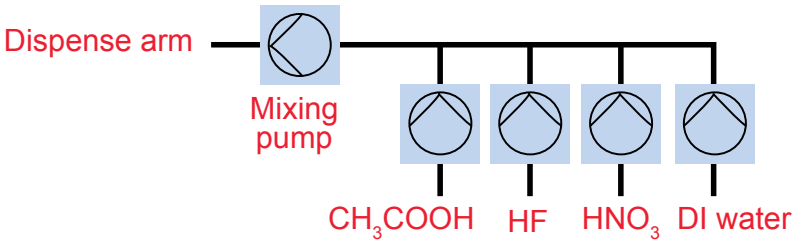
Example: Etching

Spin Etching as post-treatment after Wafer Thinning

Wafer thinning (back side grinding) is used in IC and MEMS fabrication in order to:

- Achieve a desired device thickness (ICs, MEMS)
- Ensure a specific thickness based on device functionality (MEMS)
- Reduce substrate series resistance in vertical devices (Power devices)

As a study by Dr. K. Gottfried of Fraunhofer ENAS by spin etching with HNO_3/HF/CH_3COOH on a POLOS Advanced Spin Station proved that wet etch, executed as spin etch, offered removal of 10 µm silicon, and is suitable to remove grinding induced substrate damages almost completely.



The platform offers a comparatively simple, reasonably priced process setup. The process being much faster than CMP offered a high and tunable etch rate (much faster than CMP) and the ability to process grinded wafers direct without additional cleaning.

Standard features

- Process applicable to 100mm, 150mm, and 200mm wafers with minimum conversion time (less than 15 minutes)
- Chemicals
- KOH
- HNO_3/HF/CH_3COOH (HNA)
- Wafer rotation
- Continuous wafer rotation
- Puddle mode
- Subpoints of “Dispense position and mode”
- Fix position
- Oscillating movement over a specific distance (wafer diameter)
- Spray dispense
- Flush dispense

Depending on the chemicals used

Source: Fraunhofer ENAS-Dr. Knut Gottfried, Precise Bulk Silicon Wet Etching 2013

Spin Process Station

Based on the proven high quality POLOS Single Substrate Spin Processor, the modular design Spin Process Station provides excellent value for money: full plastic construction, with high-end components, compatible with any chemical environment in a modular set-up, suitable for your specific requirement. An extremely versatile platform for a wide range of processes.

Multi-Process Chamber

The compact circular process chamber is constructed of solid polypropylene or ultra-pure PTFE, while the movable dispense arm, process tanks, and chemical supply lines are all made of ultra-pure, seamless Teflon® (PFA or PTFE). This entirely metal-free environment is suitable for a variety of aggressive media, and a multitude of processes. The sideway integrated dispense arm fully withdraws from the process chamber to avoid negative influence on process uniformity.

Modular Setup for a Wide Process Window in a Compact Footprint

General Features:

- Single Substrate
- Spin Processor
- Wide Process Window
- Manual Loading
- Flexible Processing
- Accurate & Repeatable
- Compact Footprint

Value for money

- Fully automatic, accurate and repeatable processing:
- Movable linear dispense arm:
  - Freely programmable static, dynamic or oscillating chemical dispense
  - High pressure and/or megasonic cleaning directly to any point on the substrate.
- Static chemical dispense through a range of adjust adjustable nozzles in the domed lid.
- Adjustable back-side spray arm.
- Heavy duty motor: programmable for 0 - 12,000 rpm.
- CW & CCW Rotation allowing puddle mode.
- Freely programmable processes:
  - Sequentially programmable multiple dispense line
  - Stepless programming of various flows within a process step from 150 up to 2,500 ml/min.
- For optional integrated mixing systems, the mixing rates of the various chemicals can be programmed per step.

Spin Process Station

Examples for a wide range of substrates and applications:

- **Laboratory Glass, e.g. 76x26mm**
- **Pieces & Fragments**
- **Wafers: from 1” up to 12”**

Application Exampl

- SC1-SC2-DHF Clean-Rinse
- HF/HNO_3 Etch
- Photo Resist Coat
- Edge Bead Removal (EBR)
- Puddle and/or Spray Developing
- Post CMP High Pressure and/or Megasonic Cleaning
- 70°C KOH Etch with recirculation
- Diced Wafer Clean (on Film Frame)

- **Mask/FPD Glass Substrates:**

Application Examples:

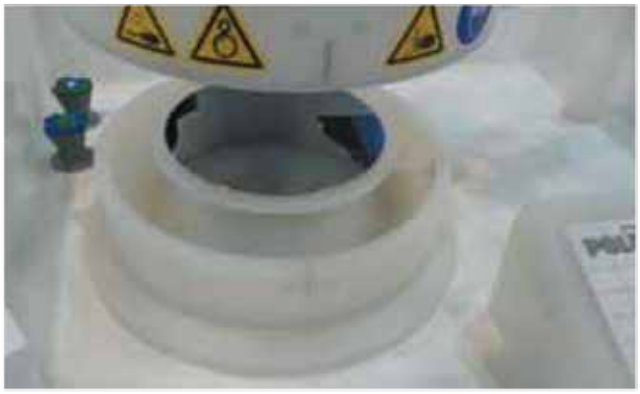
- Coat-Develop, up to 20”
- Piranha (Etch)
- Clean up to 16”

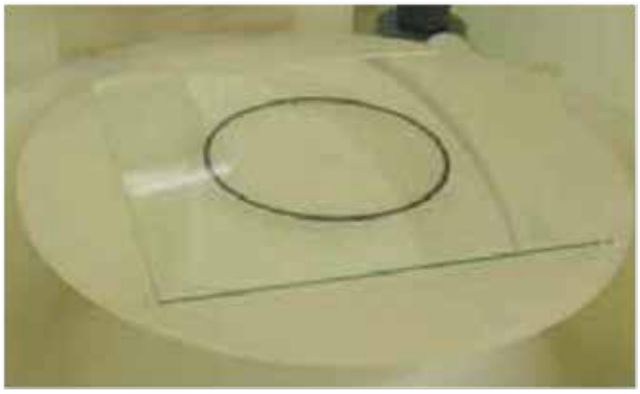
- **Solar Cells: 103, 125, 156 and 210mm square**

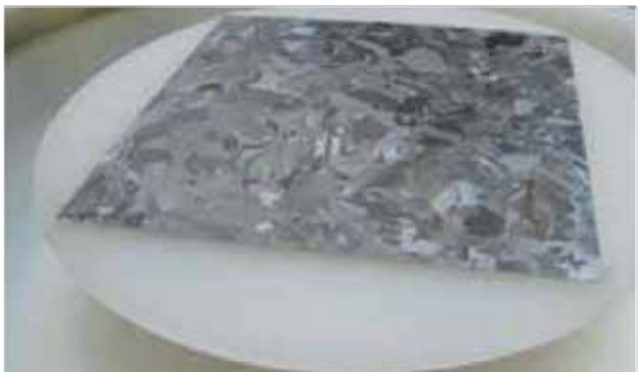
Application Examples:

- Texturing: Alkaline or Acidic
- Porous Si Etch
- Oxide Etch (PSG Removal)
- Cleaning
- Protective Layer Coating

- **Film Frames: 4” up to 12”**
- **Optical Media**







Spin Process Stations are available in an 85cm, 1m40, 1m70 or 2m wide welded polypropylene enclosure with built-in integrated spin processor, containing separate pneumatic, electrical and chemical compartments. Chemical tanks, heaters/chillers, etc. are safely stored and easily accessible in a slide-out drawer. At the heart of each Spin Process Station is the POLOS Spin Processor proven technology. These rugged, reliable units deliver repeatable performance.

Spin Process Stations offer a wide process window for your current and future requirements and are surprisingly affordable.

Spin Process Station

Safety

To protect users, the process chamber is automatically opened and the chuck is raised - presenting the substrate for easier and safer unloading. This eliminates any possible contact between the operator and possibly chemically contaminated surfaces. Both manual and automatic chamber rinse/flush sequences can be programmed, allowing all contaminated surfaces to easily be neutralized - even after a power failure. The automatic chemical supply system and the drain/extract / exhaust are integrated into the system to ensure fail-safe operation. Purged labyrinth seals, monitored safety interlocks, alarm sensors, vacuum monitoring, spin motor overload protection and emergency switch ensure the highest safety standards.

Main options:

- In-situ Z- axis chuck movement
- Linear dispense arm, servo controlled
- Multiple dispense lines & nozzles
- Several chucks designs available
- Highly responsive closed loop flow control system
- In-situ chemical mixing
- Heated chemical supply
- Megasonic cleaning
- High pressure jet
- Teflon® process tanks or dispense vessels
- Chemical reclaim, filtered chemical recirculation
- Multiple drain outputs

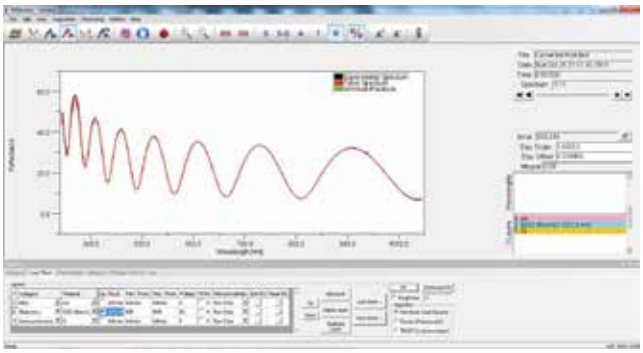
Other products

Portable Thin Film Measurement System

FR-pOrtable is a unique turn-key solution for accurate & precise optical characterization of transparent and semi-transparent single films or stack of films. With FR-pOrtable the user can perform reflectance measurements for films in the 350-1,000nm spectral range. In just one click, we characterize thin & thick transparent and semi-transparent films by analysing light reflection.

Get rid of power cables and large lab space requirements. Thanks to its unique design, FR-pOrtable draws power from the USB cable that is used for its control from the computer.

Easy, portable, with USB-Connection to your laptop



Polos Precision Bake Plate

The Modular setup of this new Table Top Hotplate enables easy plate (chuck) exchange and upgradeable options, making this a versatile and affordable tool for R&D and Pilot Lines. The POLOS Hotplate is available for processing single or double substrates. A precision digital temperature controller enables adjustable temperature steps of 1°C up to 230°C. It is suitable for soft bake as well as hard bake processes, and curing of photo resist or epoxy or any other work requiring precise temperature control.

Standard models for substrate sizes 150mm, 200mm and 500mm.

With >2,000 systems installed worldwide, up and running for over many years, our Polos Spin Coater have proven themselves as the #1 single wafer spin processor. For over 25 years now, SPS-Europe offers versatile, high-quality, all plastic POLOS™ single substrate spin processors. Various models have proven themselves over the years for processing a wide range of substrates from small fragments up to Ø450mm substrates. We offer even units for flat panels up to 1000mm square. SPS-Europe operate as a full-service distributor to the front-end semiconductor manufacturers and related industry. From our 6 offices in Europe, 1 office in Singapore, and a world-wide distributor network, we offer full-time service engineer support for the systems we supply in almost every country. Dedication towards our customers and flexibility in finding the right solution, combined with solid application knowledge and fast supply logistics, are the keywords of our service.

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